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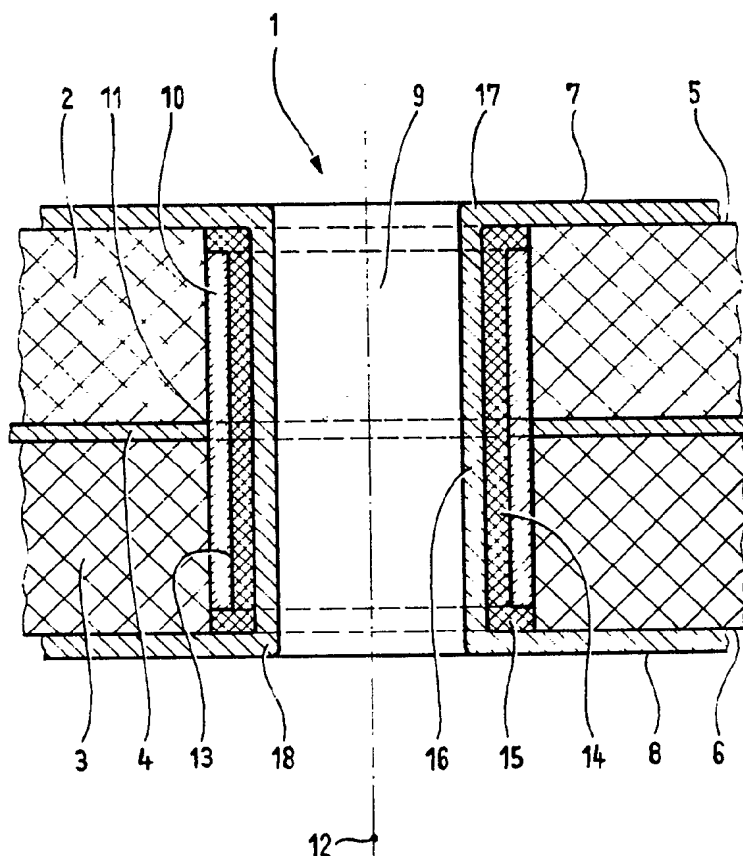
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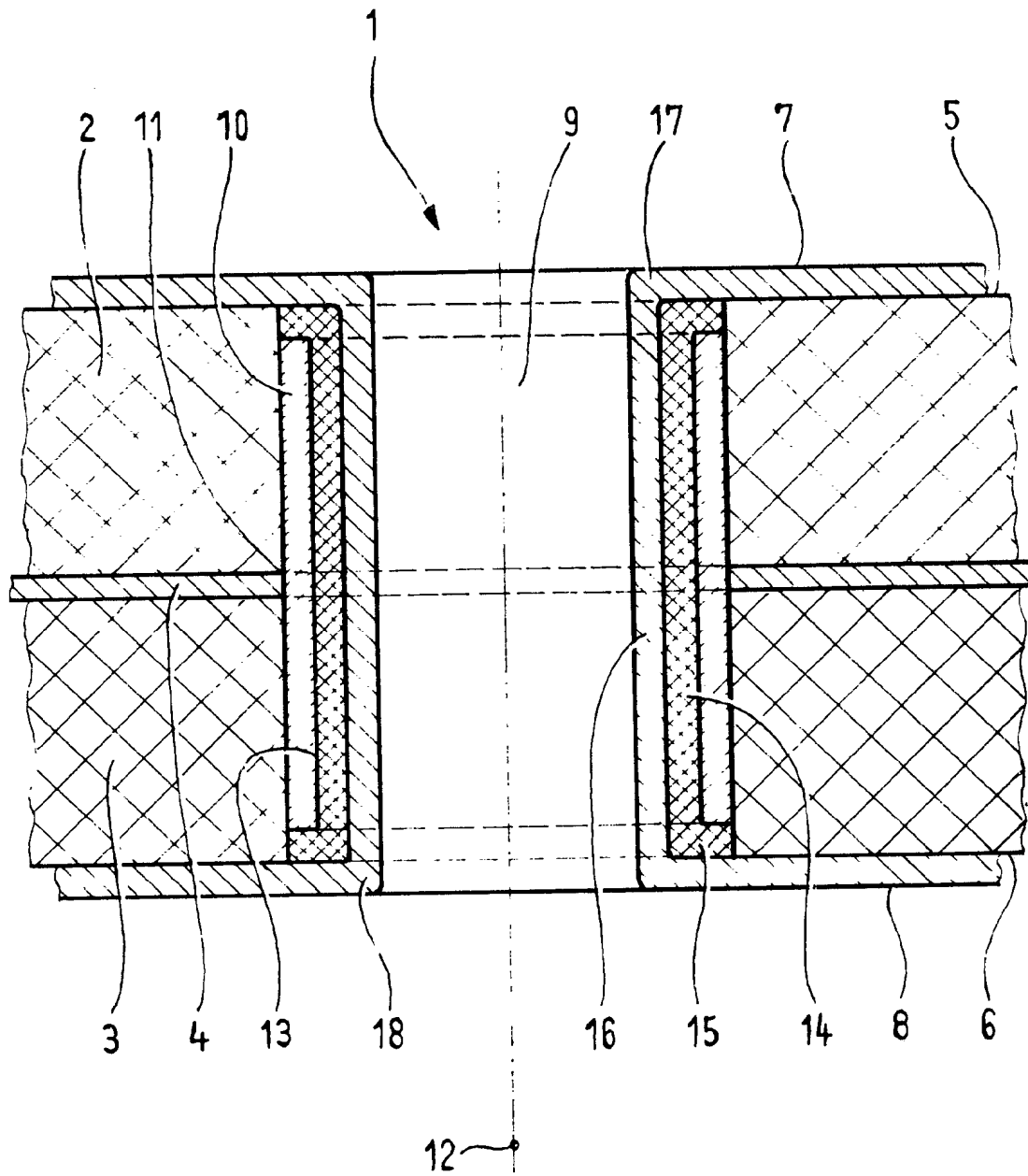
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(54) **Double layer wiring panel**

(57) A double layer wiring panel 1 for the production of printed circuits comprises panels 2 and 3, carrying two tracks 7, 8, separated by a screen film 4. A through-hole 9 has a metallic lining 10 which is connected electrically with the screen film 4. The lining 10 carries an insulating layer 14 on which a conductive layer 16 is located. The metal layer 16 which is electrically insulated from the lining 10 by means of the insulating layer 14 is in electrical contact, at its two ends 17, 18, with the tracks 7, 8. This coaxial design of the through-hole 9 makes complete uncoupling, relative to adjacent through-platings, possible.



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## SPECIFICATION

**Double layer wiring panel**

5 The invention relates to a double layer wiring panel for the production of printed circuits.

Wiring panels of synthetic resin for the production of printed circuits have been known for decades. The active and passive components of the circuit are soldered into through-holes and connected with one another by electrolytically deposited tracks. In order to establish conductive connections between the tracks on the topside (components side) and those on the bottom side (solder side), through-holes are employed, provided with a lining of electrically conducting material which is applied together with the tracks. These connections between the tracks of the topside and of the bottom side are frequently referred to as "through-platings".

For being able to construct circuits with the aid of the wiring panel system, multi-layer wiring panels have been employed, tracks in different planes being connected by means of conductive linings of certain through-holes (through-platings).

Uncoupling of adjacent tracks in different planes without interference is brought about by means of metallic screen films between the individual (component) panels of multi-layer wiring panels which are at a definite, fixed electrical potential. This achieves effective screening and cross-induction from one plane to the other is prevented.

In order also to uncouple electrically tracks placed parallel to one another in the same plane as far as possible, tracks which are at a fixed potential are placed between current-carrying tracks.

As the wiring density increases and the number of tracks placed side by side and above one another rises, their mutual screening becomes increasingly difficult, in view of the use of ever increasing working frequencies of the currents to be carried. Bus lines by means of which the components of computer systems are connected to one another make very particularly great demands. In this case, mutual electrical influence of adjacent tracks has to be avoided at all costs for reasons of safety in operation.

It has now been shown that the conductive connections of the tracks on the topside with those on the bottom side of the wiring panels, which is brought about with the aid of the linings of through-holes (through-platings), are a source of cross-induction disturbances of adjacent lines. Linings positioned side by side have a certain, even if small, capacity relative to one another, which is the cause of the cross-induction. If adjacent through-platings can be successfully uncoupled, the operating safety of the systems can be increased or the packing density of the wiring panels can be

raised.

The object of the invention is to achieve the electrical uncoupling of through-platings of wiring panels, so as to prevent cross-induction disturbances, and is attained according to the invention by the provision of a double layer wiring panel for the production of printed circuits, comprising two component panels consisting of synthetic resin and provided with metallic tracks, between which a screen film between the component panels, and through-holes having a lining of electrically conducting material connected with the screen film, an insulating layer and an electrically conductive metal layer, wherein the metal layer is electrically insulated from the lining by means of the insulating layer and is in electrical contact at its two ends with the metallic tracks.

The design of the through-hole enables, for example, the lining to be placed at a fixed electrical potential and to be used as a screen, the metal layer then serving, in place of the lining, as a conducting connection between the tracks of the topside and the bottom side.

The interior of a through-hole becomes a coaxial line, the lining being the external conductor and the metal layer the internal conductor; as a result, the screening of the through-plating, obtained in this way, is complete across the thickness of the wiring panel and the uncoupling relative to adjacent through-platings is excellent, especially in the case of thick multi-layer wiring panels. In addition, two connections, electrically insulated from each other, between tracks of the topside and bottom side of a wiring panel can be established in a single through-hole with the aid of this coaxial line. If it proves useful, the metal layer, placed on the insulating layer, can be designed as a plug-in socket, that is to say, for example, by a very thin small copper tube.

Suitably the insulating layer is a layer of insulating varnish, which renders the production of the proposed through-plating considerably easier.

An exemplary embodiment of the invention will now be explained in detail with reference to the accompanying drawing which is a magnified view of a portion of a double layer wiring panel in longitudinal and cross-section, respectively, the section being taken through a through-hole.

The double layer wiring panel (platen) 1 shown in the drawing consists of synthetic resin and comprises two panels 2 and 3 of equal thickness between which is located a screen film 4 consisting of copper. The screen film 4 serves for the electrostatic screening (uncoupling) of metallic tracks 7 and 8 applied to the topside 5 and the bottom side 6 of the double layer wiring panel 1 which thus exhibits a two-sided conductive pattern.

The double layer wiring panel 1 is provided with a plurality of through-holes 9 placed side

by side and in succession, and which serve primarily for fastening electrical circuit elements (not shown) on the double layer wiring panel 1,—e.g. resistors, capacitors, transistors, integrated circuits,—their connecting wires being passed through the through-holes 9 and then soldered to the tracks.

The through-hole 9 is provided with an electrolytically deposited lining 10 of an electrically conducting material,—for example copper. The lining 10 which has the form of a thin cylindrical tube is connected, under electrically conductive conditions, at its centre 11 with the screen film 4.

The lining 10 carries an insulating layer 14 on its interior side 13 pointing towards the axis 12 of the through-hole 9, this insulating layer consisting of an insulating varnish. The insulating layer 14, in the shape of a thin cylindrical tube, includes a small outward pointing flange 15 at each of its two ends, this flange forming an insulating enclosure around the ends of the lining 10.

A metal layer 16 of an electrically conducting material, for example, of electrolytically deposited copper, is placed on the insulating layer 14. The metal layer 16, which, like the lining 10 and the insulating layer, also has a cylindrical tubular design and which can also be a small plug-in socket, is in electrical contact by its two ends 17, 18 with the tracks 7 and 8.

In combination with the lining 10, the metal layer 16 and the insulating layer 14 form a part of a hollow coaxial line, the lining 10 being the external conductor and the metal layer 16 the internal conductor.

#### CLAIMS

1. A double layer wiring panel for the production of printed circuits, comprising two component panels consisting of synthetic resin and provided with metallic tracks, between which a screen film between the component panels, and through-holes having a lining of electrically conducting material connected with the screen film, an insulating layer and an electrically conductive metal layer, wherein the metal layer is electrically insulated from the lining by means of the insulating layer and is in electrical contact at its two ends with the metallic tracks.

2. A double layer wiring panel according to Claim 1, wherein the metal layer is formed as a plug-in socket.

3. A double layer wiring panel according to Claim 1 or 2, wherein the insulating layer is a layer of insulating varnish.

4. A double layer wiring panel substantially as hereinbefore described with reference to the accompanying drawing.